We claim:

1. An apparatus integrating forward and panoramic fields, comprising:

a primary reflector, comprising a convex surface in relation to the forward field, reflective on at least part of said convex surface;

a secondary reflector, forward of said primary reflector relative to said forward field, reflective on at least part a surface thereof facing rearward toward said primary reflector;

a primary reflector hole in said primary reflector, substantially centered about an optical axis of said apparatus; and

a secondary reflector hole in said secondary reflector, substantially centered about said optical axis.

2. The apparatus of claim 1, further comprising:

at least one field collecting element, forward of said secondary reflector relative to said forward field, substantially centered about said optical axis.

3. The apparatus of claim 2:

said at least one field collecting element comprising at least two field collecting elements, with at least one of said field collecting elements movable along said optical axis.

4. The apparatus of claim 1, further comprising:

at least one field focusing element, rearward of said primary reflector relative to said forward field, substantially centered about said optical axis.

5. The apparatus of claim 1, further comprising:

at least one afocal element, rearward of said primary reflector relative to said forward field, substantially centered about said optical axis.

6. The apparatus of claim 1, further comprising:

at least one field collecting element, forward of said secondary reflector relative to said forward field, substantially centered about said optical axis; and

at least one field focusing element, rearward of said primary reflector relative to said forward field, substantially centered about said optical axis.

7. The apparatus of claim 6, wherein:

said primary reflector, said secondary reflector, at least one field collecting element and said at least one field focusing element are configured, in combination, to project a substantially seamless boundary between said forward and panoramic fields onto a detection plane.

8. The apparatus of claim 6, further comprising:

a detector substantially in a focal plane of said at least one field focusing element.

9. The apparatus of claim 8, said detector comprising an optical detector.

10. The apparatus of claim 8, said detector comprising an infrared detector.

11. The apparatus of claim 8, said detector comprising an detector for communications waves.

12. The apparatus of claim 1:

said convex surface of said primary reflector comprising a substantially spherical geometry.

13. The apparatus of claim 1:

said convex surface of said primary reflector comprising a substantially hyperbolic geometry.

14. The apparatus of claim 1:

said convex surface of said primary reflector comprising a substantially parabolic geometry.

15. The apparatus of claim 1, wherein a diameter of said secondary reflector hole is larger than a diameter of said primary reflector hole.

16. The apparatus of claim 1, said secondary reflector comprising a substantially flat geometry facing rearward toward said primary reflector.

17. The apparatus of claim 1, said secondary reflector comprising a concave geometry facing rearward toward said primary reflector.

18. The apparatus of claim 1, said secondary reflector comprising a convex geometry facing rearward toward said primary reflector.

19. The apparatus of claim 1, wherein said primary reflector can be tilted relative to said optical axis.

20. The apparatus of claim 1, wherein said forward and panoramic fields comprise optical fields in the visible light spectrum.

21. The apparatus of claim 1, wherein said forward and panoramic fields comprise optical fields in the infrared light spectrum.

22. The apparatus of claim 1, wherein said forward and panoramic fields comprise electromagnetic waves.

23. The apparatus of claim 1, wherein said forward and panoramic fields comprise electromagnetic waves traveling in free space for communication.

24. A method for receiving signals with integrated forward and panoramic fields, comprising:

providing a primary reflector, comprising a convex surface in relation to the forward field, reflective on at least part of said convex surface;

facing a secondary reflector, forward of said primary reflector relative to said forward field, reflective on at least part a surface thereof, rearward toward said primary reflector;

substantially centering a primary reflector hole in said primary reflector, about an optical axis of said primary reflector and said secondary reflector; and

substantially centering a secondary reflector hole in said secondary reflector, about said optical axis.

25. The method of claim 24, further comprising:

substantially centering at least one field collecting element, forward of said secondary reflector relative to said forward field, about said optical axis.

26. The method of claim 25, wherein said at least one field collecting element comprises at least two field collecting elements, further comprising:

moving at least one of said field collecting elements along said optical axis.

27. The method of claim 24, further comprising:

substantially centering at least one field focusing element, rearward of said primary reflector relative to said forward field, about said optical axis.

28. The method of claim 24, further comprising:

substantially centering at least one afocal element, rearward of said primary reflector relative to said forward field, about said optical axis.

29. The method of claim 24, further comprising:

substantially centering at least one field collecting element, forward of said secondary reflector relative to said forward field, about said optical axis; and

substantially centering at least one field focusing element, rearward of said primary reflector relative to said forward field, about said optical axis.

30. The apparatus of claim 29, further comprising:

configuring said primary reflector, said secondary reflector, at least one field collecting element and said at least one field focusing element are, in combination, to project a substantially seamless boundary between said forward and panoramic fields onto a detection plane.

31. The method of claim 29, further comprising:
providing a detector substantially in a focal plane of said at least one field focusing element.

32. The method of claim 31, said detector comprising an optical detector.

33. The method of claim 31, said detector comprising an infrared detector.

34. The apparatus of claim 8, said detector comprising an detector for communications waves.

35. The method of claim 24:
said convex surface of said primary reflector comprising a substantially spherical geometry.

36. The method of claim 24:
said convex surface of said primary reflector comprising a substantially hyperbolic geometry.

37. The method of claim 24:
said convex surface of said primary reflector comprising a substantially parabolic geometry.

38. The method of claim 24, wherein a diameter of said secondary reflector hole is larger than a diameter of said primary reflector hole.

39. The method of claim 24, further comprising:
facing a substantially flat geometry of said secondary reflector rearward toward said primary reflector.

40. The method of claim 24, further comprising:
facing a concave geometry of said secondary reflector rearward toward said primary reflector.

41. The method of claim 24, further comprising:
facing a convex geometry of said secondary reflector rearward toward said primary reflector.

42. The method of claim 24, further comprising:
tilting said primary reflector relative to said optical axis.

43. The apparatus of claim 24, said receiving further comprising:
receiving optical fields in the visible light spectrum.

44. The apparatus of claim 24, said receiving further comprising:
receiving optical fields in the infrared light spectrum.

45. The apparatus of claim 24, said receiving further comprising:
receiving electromagnetic waves.

46. The apparatus of claim 24, said receiving further comprising:
communicating through free space by receiving electromagnetic waves.

AMENDED CLAIMS

received by the International Bureau on 01 August 2005 (01.08.05): original claims 1-46 have been replaced by amended claims 1-44 (4 pages).

+ STATEMENT

We claim:

1. An apparatus integrating forward and panoramic fields, comprising:

a primary reflector, comprising a convex surface in relation to the forward field, reflective on at least part of said convex surface;

a secondary reflector, forward of said primary reflector relative to said forward field, reflective on at least part a surface thereof facing rearward toward said primary reflector, comprising a substantially flat geometry facing rearward toward said primary reflector;

a primary reflector hole in said primary reflector, substantially centered about an optical axis of said apparatus; and

a secondary reflector hole in said secondary reflector, substantially centered about said optical axis, said secondary reflector hole comprising a diameter smaller than a diameter of said primary reflector hole.

2. The apparatus of claim 1, further comprising:

at least one field collecting element, forward of said secondary reflector relative to said forward field, substantially centered about said optical axis.

3. The apparatus of claim 2:

said at least one field collecting element comprising at least two field collecting elements, with at least one of said field collecting elements movable along said optical axis.

4 The apparatus of claim 1, further comprising:

at least one field focusing element, rearward of said primary reflector relative to said forward field, substantially centered about said optical axis.

5. The apparatus of claim 1, further comprising:

at least one afocal element, rearward of said primary reflector relative to said forward field, substantially centered about said optical axis.

6. The apparatus of claim 1, further comprising:

at least one field collecting element, forward of said secondary reflector relative to said forward field, substantially centered about said optical axis, and

at least one field focusing element, rearward of said primary reflector relative to said forward field, substantially centered about said optical axis.

7. The apparatus of claim 6, wherein:

said primary reflector, said secondary reflector, at least one field collecting element and said at least one field focusing element are configured, in combination, to project a substantially seamless boundary between said forward and panoramic fields onto a detection plane.

8. The apparatus of claim 6, further comprising:

a detector substantially in a focal plane of said at least one field focusing element.

9 The apparatus of claim 8, said detector comprising an optical detector.

10. The apparatus of claim 8, said detector comprising an infrared detector.

11. The apparatus of claim 8, said detector comprising an detector for communications waves.

12. The apparatus of claim 1:

said convex surface of said primary reflector comprising a substantially spherical geometry.

13. The apparatus of claim 1:

said convex surface of said primary reflector comprising a substantially hyperbolic geometry.

14. The apparatus of claim 1:

said convex surface of said primary reflector comprising a substantially parabolic geometry.

15. The apparatus of claim 1, said secondary reflector comprising a concave geometry facing rearward toward said primary reflector.

16. The apparatus of claim 1, said secondary reflector comprising a convex geometry facing rearward toward said primary reflector.

17. The apparatus of claim 1, wherein said primary reflector can be tilted relative to said optical axis.

18. The apparatus of claim 1, wherein said forward and panoramic fields comprise optical fields in the visible light spectrum.

19. The apparatus of claim 1, wherein said forward and panoramic fields comprise optical fields in the infrared light spectrum.

20. The apparatus of claim 1, wherein said forward and panoramic fields comprise electromagnetic waves.

21. The apparatus of claim 1, wherein said forward and panoramic fields comprise electromagnetic waves traveling in free space for communication.

22. A method for receiving signals with integrated forward and panoramic fields, comprising:

providing a primary reflector, comprising a convex surface in relation to the forward field, reflective on at least part of said convex surface;

facing a substantially flat geometry of a secondary reflector, forward of said primary reflector relative to said forward field, reflective on at least part a surface thereof, rearward toward said primary reflector;

substantially centering a primary reflector hole in said primary reflector, about an optical axis of said primary reflector and said secondary reflector; and

substantially centering a secondary reflector hole in said secondary reflector, about said optical axis; wherein:

a diameter of said secondary reflector hole is smaller than a diameter of said primary reflector hole.

23. The method of claim 22, further comprising.

substantially centering at least one field collecting element, forward of said secondary reflector relative to said forward field, about said optical axis.

24. The method of claim 23, wherein said at least one field collecting element comprises at least two field collecting elements, further comprising:

moving at least one of said field collecting elements along said optical axis.

25. The method of claim 22, further comprising:

substantially centering at least one field focusing element, rearward of said primary reflector relative to said forward field, about said optical axis.

26. The method of claim 22, further comprising:

substantially centering at least one afocal element, rearward of said primary reflector relative to said forward field, about said optical axis.

27. The method of claim 22, further comprising:

substantially centering at least one field collecting element, forward of said secondary reflector relative to said forward field, about said optical axis; and

substantially centering at least one field focusing element, rearward of said primary reflector relative to said forward field, about said optical axis.

28. The apparatus of claim 27, further comprising:

configuring said primary reflector, said secondary reflector, at least one field collecting element and said at least one field focusing element are, in combination, to project a substantially seamless boundary between said forward and panoramic fields onto a detection plane.

29. The method of claim 27, further comprising:
providing a detector substantially in a focal plane of said at least one field focusing element.

30. The method of claim 29, said detector comprising an optical detector.

31. The method of claim 29, said detector comprising an infrared detector.

32 The apparatus of claim 8, said detector comprising an detector for communications waves.

33. The method of claim 22:
said convex surface of said primary reflector comprising a substantially spherical geometry.

34. The method of claim 22:
said convex surface of said primary reflector comprising a substantially hyperbolic geometry

35. The method of claim 22:
said convex surface of said primary reflector comprising a substantially parabolic geometry.

36. The method of claim 22, further comprising:
facing a concave geometry of said secondary reflector rearward toward said primary reflector.

37. The method of claim 22, further comprising:
facing a convex geometry of said secondary reflector rearward toward said primary reflector.

38. The method of claim 22, further comprising:
tilting said primary reflector relative to said optical axis.

39. The apparatus of claim 22, said receiving further comprising:
receiving optical fields in the visible light spectrum.

40. The apparatus of claim 22, said receiving further comprising:
receiving optical fields in the infrared light spectrum.

41. The apparatus of claim 22, said receiving further comprising:
receiving electromagnetic waves.

42. The apparatus of claim 22, said receiving further comprising:
communicating through free space by receiving electromagnetic waves.

43 An apparatus integrating forward and panoramic fields, comprising:

a primary reflector, comprising a convex surface in relation to the forward field, reflective on at least part of said convex surface;

a secondary reflector, forward of said primary reflector relative to said forward field, reflective on at least part a surface thereof facing rearward toward said primary reflector, comprising a substantially flat geometry facing rearward toward said primary reflector;

a primary reflector hole in said primary reflector, substantially centered about an optical axis of said apparatus; and

said secondary reflector comprising a diameter smaller than a diameter of said primary reflector.

44. A method for receiving signals with integrated forward and panoramic fields, comprising:

providing a primary reflector, comprising a convex surface in relation to the forward field, reflective on at least part of said convex surface;

facing a substantially flat geometry of a secondary reflector, forward of said primary reflector relative to said forward field, reflective on at least part a surface thereof, rearward toward said primary reflector;

substantially centering a primary reflector hole in said primary reflector, about an optical axis of said primary reflector and said secondary reflector; and

substantially centering a secondary reflector hole in said secondary reflector, about said optical axis; wherein:

a diameter of said secondary reflector is smaller than a diameter of said primary reflector.